

Name: \_\_\_\_\_

### at1118paper: Complete the Square (v417)

#### Example

By completing the square, find both solutions to the given equation:

$$x^2 - 38x = -312$$

Add  $(\frac{-38}{2})^2$ , which equals 361, to both sides of the equation.

$$x^2 - 38x + 361 = 49$$

Factor the left side.

$$(x - 19)^2 = 49$$

Undo the squaring. We need to consider both  $\pm\sqrt{49}$ .

$$x - 19 = -7$$

or

$$x - 19 = 7$$

$$x = 12$$

or

$$x = 26$$

#### Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 52x = 413$$

$$x^2 - 52x + 676 = 1089$$

$$(x - 26)^2 = 1089$$

$$x - 26 = \pm 33$$

$$x = -7 \quad \text{or} \quad x = 59$$

#### Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 48x = 448$$

$$x^2 + 48x + 576 = 1024$$

$$(x + 24)^2 = 1024$$

$$x + 24 = \pm 32$$

$$x = -56 \quad \text{or} \quad x = 8$$

### **Question 3**

By completing the square, find both solutions to the given equation:

$$x^2 + 38x = -192$$

$$x^2 + 38x + 361 = 169$$

$$(x + 19)^2 = 169$$

$$x + 19 = \pm 13$$

$$x = -32 \quad \text{or} \quad x = -6$$

### **Question 4**

By completing the square, find both solutions to the given equation:

$$x^2 - 10x = 231$$

$$x^2 - 10x + 25 = 256$$

$$(x - 5)^2 = 256$$

$$x - 5 = \pm 16$$

$$x = -11 \quad \text{or} \quad x = 21$$

### **Question 5**

By completing the square, find both solutions to the given equation:

$$x^2 - 18x = 280$$

$$x^2 - 18x + 81 = 361$$

$$(x - 9)^2 = 361$$

$$x - 9 = \pm 19$$

$$x = -10 \quad \text{or} \quad x = 28$$

### **Question 6**

By completing the square, find both solutions to the given equation:

$$x^2 - 22x = 104$$

$$x^2 - 22x + 121 = 225$$

$$(x - 11)^2 = 225$$

$$x - 11 = \pm 15$$

$$x = -4 \quad \text{or} \quad x = 26$$